Title: Image Data Compression Inventor: Goldstein et al. Filing Date: Concurrently Herewith Express Mail Label No.: EV306655340US

Sheet: 1 of 8 Attorney Docket No: 042390.P4228CD2

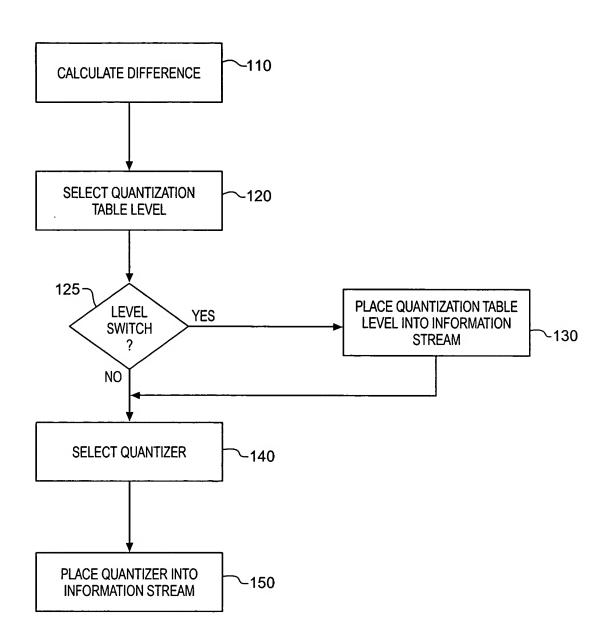


FIG. 1

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP (303) 740-1980 Title: Image Data Compression Inventor: Goldstein et al. Filing Date: Concurrently Herewith Express Mail Label No.: EV306655340US Sheet: 2 of 8 Attorney Docket No: 042390.P4228CD2 **BEGIN** PLACE LINE 0 IN BUFFER -208 PLACE LINE 0 INTO INFO STREAM 210

202-

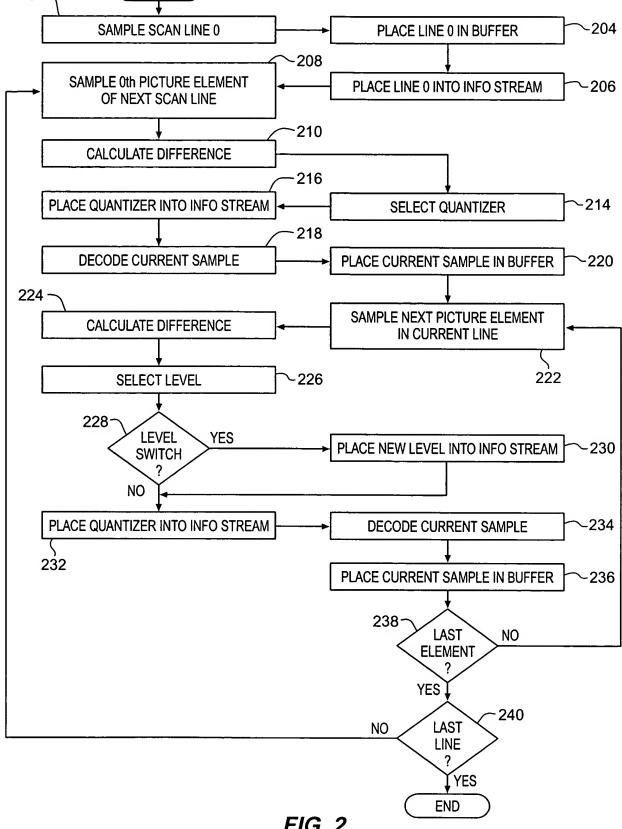


FIG. 2

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EXAMPLE Y-PLANE										
SAMPLE	0	1	2	3	4	5	6	7		
LINE 0 (PREVIOUS LINE)	157	158	153	152	159	162	108	107		
LINE 1 (CURRENT LINE)	156	158	157	159	40	60	111	116		

FIG. 3

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# **EXAMPLE QUANTIZER TABLE QUANTIZERS**

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	0	0	1	-1	2	-2	3	-3	4	-4	5	-5	6	-6	7	-7
Æ	1	0	4	-4	9	-9	16	-126	25	-25	36	-36	49	-49	64	-64
回	2	0	5	-5	15	-15	32	-32	55	-55	88	-88	129	-129	181	-181
	3	0	8	-8	27	-27	64	-64								
	4	0	11	-11	46	-46	128	-128								

FIG. 4

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### HIGH QUALITY, 4-BIT ENCODING EXAMPLE

SAMPLE	DIFFERENCE	BEST LEVEL	LEVEL USED	QUANTIZER	QUANTIZATION VALUE	INFORMATION STREAM
0	-1	1	1	0	0	0
1	0	1	1	0	0	0
2	4	<u>,</u> 1	1	1	4	1
3	7	1	1	3	9	3
4	-119	2	2	12	-129	15, 2 LEVEL SHIFT
						12
5	-102	2	2	10	-88	10
6	3	1	2	1	5	1
7	9	1	2	1	5	1

FIG. 5A

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SAMPLE	0	1	2	3	4	5	6	7
LINE 0 (PREVIOUS LINE)	157	158	153	152	159	162	108	107
LINE 1 (CURRENT LINE)	157	158	157	161	30	74	113	111

FIG. 5B

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### HIGH QUALITY, 3-BIT ENCODING EXAMPLE

SAMPLE	DIFFERENCE	BEST LEVEL		QUANTIZER	QUANTIZATION VALUE	INFORMATION STREAM
0	-1	2	2	0	0	0
1	0	2	2	0	0	0
2	4	2	2	1	5	1
3	7	2	2	1	5	1
4	-119	4	4	6	-128	7, 4 LEVEL SHIFT
						6
5	-102	4	4	6	-128	6
6	3	2	4	0	0	0
7	9	2	4	1	11	1

FIG. 6A

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SAMPLE	0	1	2	3	4	5	· 6	7
LINE 0 (PREVIOUS LINE)	157	158	153	152	159	162	108	107
LINE 1 (CURRENT LINE)	157	158	158	157	31	34	108	118

FIG. 6B

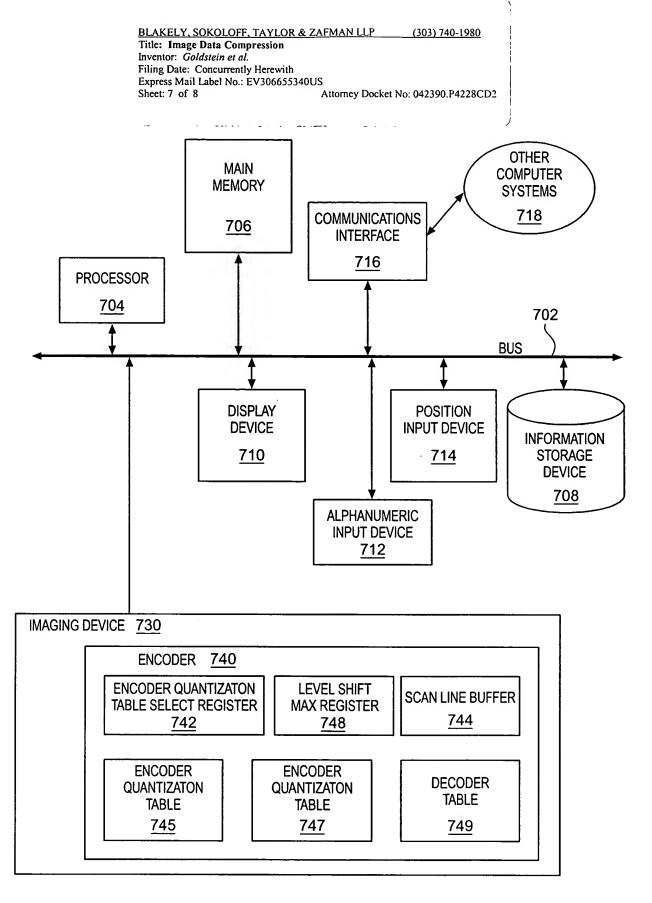


FIG. 7

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#### **QUANTIZER (LIMIT)**

		0	1, 2	3, 4	5, 6	7, 8	9, 10	11, 12	13, 14 (LAST)
	0	1	2	3	4	5	6	7	8
	1	3	7	13	21	31	43	57	Y 65
LEVEL									$C_R$ , $C_B$ MAX
	2	3	_11	24	44	72	109	156	Y MAX
	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

4-BIT ENCODE TABLE (NO UNDER CORRECTION)

## FIG. 8A

### **QUANTIZER (LIMIT)**

1, 2 5, 6 7,8 0 3, 4 9, 10 11, 12 13, 14 (LAST) 0 2 4 10 6 8 12 14 15 6 14 26 42 62 114 Y 129 86 **LEVEL**  $C_R$ ,  $C_B$  MAX 2 6 22 48 88 144 218 312 Y MAX 3 N/A N/A N/A N/A N/A N/A N/A N/A 4 N/A N/A N/A N/A N/A N/A N/A N/A

4-BIT ENCODE TABLE (50% UNDER CORRECTION)

FIG. 8B

#### **QUANTIZER**

1, 2 3, 4 5, 6 7,8 9, 10 11, 12 13, 14 0 2 3 5 1 4 6 7 4 9 16 25 36 49 64 2 5 15 32 55 88 129 181 3 N/A N/A N/A N/A N/A N/A N/A 4 N/A N/A N/A N/A N/A N/A N/A

4-BIT DECODE TABLE

FIG. 8C

LEVEL